of clear days for the district was 14; partly cloudy, 7; and cloudy, 10.

Southwesterly winds prevailed in southern and northwesterly winds in northern sections The highest velocity reported was at the rate of 46 miles an hour from the north, on the 1st, at St. Paul, Minn.

## DR. FRIEDRICH BRENDEL.

[By M. L. FULLER, Local Forecaster, Peoria, Ill.]

Friedrich Brendel, M. D., was a native of Erlangen, Bavaria, from whose university he graduated in 1839. He was a patriot in the German Revolution of 1848, and was compelled for that reason to leave the Fatherland in 1850. After two years' residence in St. Louis, Mo., he settled in Peoria, Ill., in 1852. His records of temperature and rainfall began in December, 1855, and continued practically unbroken for 50 years, constituting, with the subsequent work of the Weather Bureau station, the longest continuous record kept within the State of Illinois.

Dr. Brendel was a physician of excellent standing, a botanist of note, author of a 90-page pamphlet on "Flora Peoriana," a man of scientific tastes, and of deep devotion to his work. It is related of him on the best of authority that in his later years, while seriously ill and lying day after day apparently unconscious, he would still rouse regularly about the observation hour and direct the nurses to read the thermometers. The records kept by such an observer possess more than ordinary interest. Dr. Brendel's death occurred August 10, 1912, at the advanced age of nearly 93 years. His records have been extensively used in compiling the climatology of Illinois, and the originals are in the Weather Bureau offices at Springfield and Peoria.

## PROLONGED DRY PERIOD IN MINNESOTA.

[THOMAS A. BLAIR, observer, Minneapolis, Minn.]

The fall of 1912 has been notable in Minnesota for mild temperatures and deficiency of precipitation. Following a pleasant summer, marked by no long heated periods, and in which the average daily temperature for the months of June to September, inclusive, was 1.5° below the normal, the months of October and November prolonged the agreeable weather and shortened the winter by temperature departures in the opposite direction, the average daily excess in October being 1.7° and in November 5.6°, with an entire absence of cold waves. For October the average temperature for the State was 47.5°, which has been exceeded five times during the past 18 years; for November the mean was 33.9°, which has been exceeded but twice during the same period; likewise, the combined mean of the two months has been exceeded but twice.

But it is to the long dry spell and the general deficiency in precipitation that special attention is directed in this note. The deficiency began in September, amounting in that month to 0.49 inch, and was general except in the Red River Valley. October precipitation was below normal at every station in the State except Hallock, in the extreme northwest. The average amount was 0.97 inch, which equals the amount in the extremely dry year of 1910. The only less amount recorded was 0.25 inch, in 1895. In November the southeastern counties of the State received one good rain, on the 12th; the rest of the State and, for the remainder of the month, the entire State, received but very light precipitation, amounting in general to less than 0.20 inch. Over a considerable portion of the State, principally in the upper Minnesota Valley, no amounts in excess of a trace fell during the month. At Minneapolis there was 0.08 inch, the least amount for November recorded in 77 years of observations in this vicinity. The State average for November was 0.36 inch, which is one-third the normal amount. Less amounts are recorded in 1903 and 1904. The total for the three months of September, October, and November was 4.36 inches. Only the years 1897 and 1910, with 3.97 and 3.94, respectively, had smaller averages. The year 1910 was the driest year on record, precipitation being deficient in all months except January; but in 1897, as in 1912, there was an accumulated excess at the beginning of September.

The area in which the drought was most marked extends from east to west across the central portion of the State, between the latitudes of St. Paul and Duluth. The following is a list of stations at which no measurable amount of precipitation fell for the periods indicated:

| | | | |
|---|---|---|---|
| Alexandria | 57 days | Sept. 26– | Nov. 21 |
| Beardsley | 44 days | Oct. 12– | Nov. 24 |
| Bird Island | 49 days | Oct. 13– | Nov. 30 |
| Collegeville | 41 days | Oct. 13– | Nov. 22 |
| Fort Ripley | 41 days | Oct. 13– | Nov. 22 |
| Glencoe | 54 days | Oct. 12– | Dec. 4 |
| Halstad | 45 days | Oct. 30– | Dec. 13 |
| Hinckley | 44 days | Oct. 12– | Nov. 24 |
| Long Prairie | 44 days | Oct. 12– | Nov. 24 |
| Lynd | 50 days | Oct. 12– | Nov. 30 |
| Milan | 44 days | Oct. 12– | Nov. 24 |
| Montevideo | 41 days | Oct. 12– | Nov. 21 |
| Morris | 44 days | Oct. 12– | Nov. 24 |
| New London | 50 days | Oct. 12– | Nov. 30 |
| Osakis | 42 days | Oct. 12– | Nov. 22 |
| Pierz | 44 days | Oct. 12– | Nov. 24 |
| Pipestone | 54 days | Oct. 12– | Dec. 4 |
| St. Cloud | 43 days | Oct. 13– | Nov. 24 |
| Stillwater | 49 days | Oct. 13– | Nov. 30 |
| Taylors Falls | 35 days | Oct. 21– | Nov. 24 |
| Worthington | 31 days | Oct. 12– | Nov. 11 |

Many of the same stations had much longer periods with amounts of less than 0.20 inch, as shown by the following table:

| | | | | |
|---|---|---|---|---|
| Alexandria | 69 days | Sept. 26– | Dec. 4 | 0.17 |
| Beardsley | 54 days | Oct. 12– | Dec. 4 | 0.05 |
| Bird Island | 63 days | Oct. 13– | Dec. 4 | 0.17 |
| Campbell | 45 days | Oct. 11– | Nov. 24 | 0.02 |
| Collegeville | 53 days | Oct. 13– | Dec. 4 | 0.13 |
| Crookston | 44 days | Oct. 20– | Dec. 2 | 0.13 |
| Halstad | 78 days | Sept. 26– | Dec. 13 | 0.11 |
| Itasca State Park | 36 days | Oct. 30– | Dec. 4 | 0.04 |
| Long Prairie | 56 days | Oct. 12– | Dec. 6 | 0.10 |
| Lynd | 66 days | Oct. 12– | Dec. 16 | 0.10 |
| Milan | 54 days | Oct. 12– | Dec. 4 | 0.10 |
| Minneapolis | 50 days | Oct. 12– | Nov. 30 | 0.14 |
| Montevideo | 59 days | Oct. 12– | Dec. 9 | 0.16 |
| Moorhead | 71 days | Oct. 6– | Dec. 15 | 0.15 |
| Mora | 44 days | Oct. 12– | Nov. 24 | 0.02 |
| New London | 54 days | Oct. 12– | Dec. 4 | 0.06 |
| New Ulm | 50 days | Oct. 12– | Nov. 30 | 0.11 |
| Osakis | 66 days | Oct. 12– | Dec. 16 | 0.18 |
| Pierz | 81 days | Oct. 12– | Dec. 31 | 0.19 |
| Pine River Dam | 50 days | Oct. 12– | Nov. 30 | 0.19 |
| Pipestone | 66 days | Oct. 12– | Dec. 16 | 0.20 |
| Roseau | 50 days | Oct. 31– | Dec. 19 | 0.05 |
| St. Cloud | 49 days | Oct. 13– | Nov. 30 | 0.01 |
| St. Paul | 40 days | Oct. 22– | Nov. 30 | 0.10 |
| Sandy Lake Dam | 44 days | Oct. 12– | Nov. 24 | 0.16 |
| Taylors Falls | 50 days | Oct. 12– | Nov. 30 | 0.13 |
| Two Harbors | 50 days | Oct. 12– | Nov. 30 | 0.14 |
| Worthington | 54 days | Oct. 12– | Dec. 4 | 0.15 |

The period of 44 days from October 12 to November 24, inclusive, was the most common one without measurable precipitation, but the average for the 21 stations of